



Mechanisms of Johkasou Act

28th November, 2023

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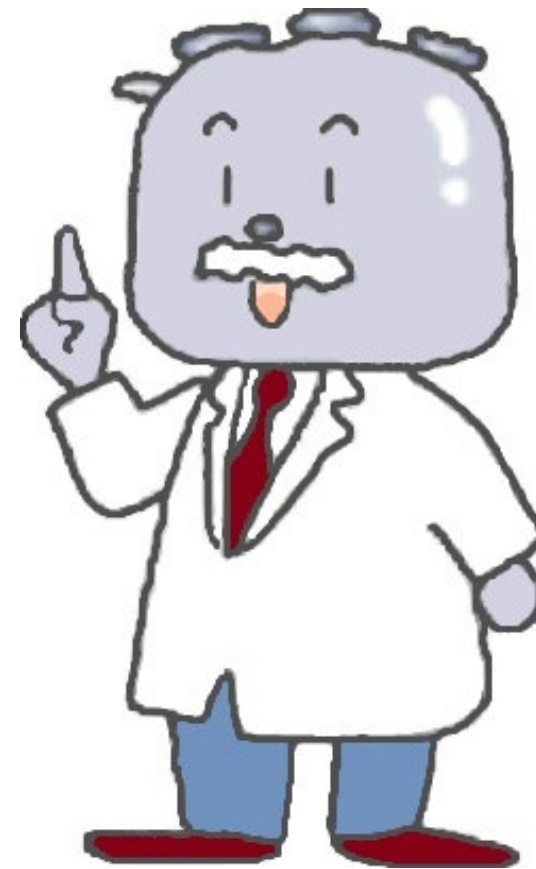
Office for Promotion of Johkasou
Waste Management Division
Environmental Regeneration and Material Cycles Bureau
Ministry of the Environment
Government of JAPAN

<https://www.env.go.jp/recycle/jokaso/>

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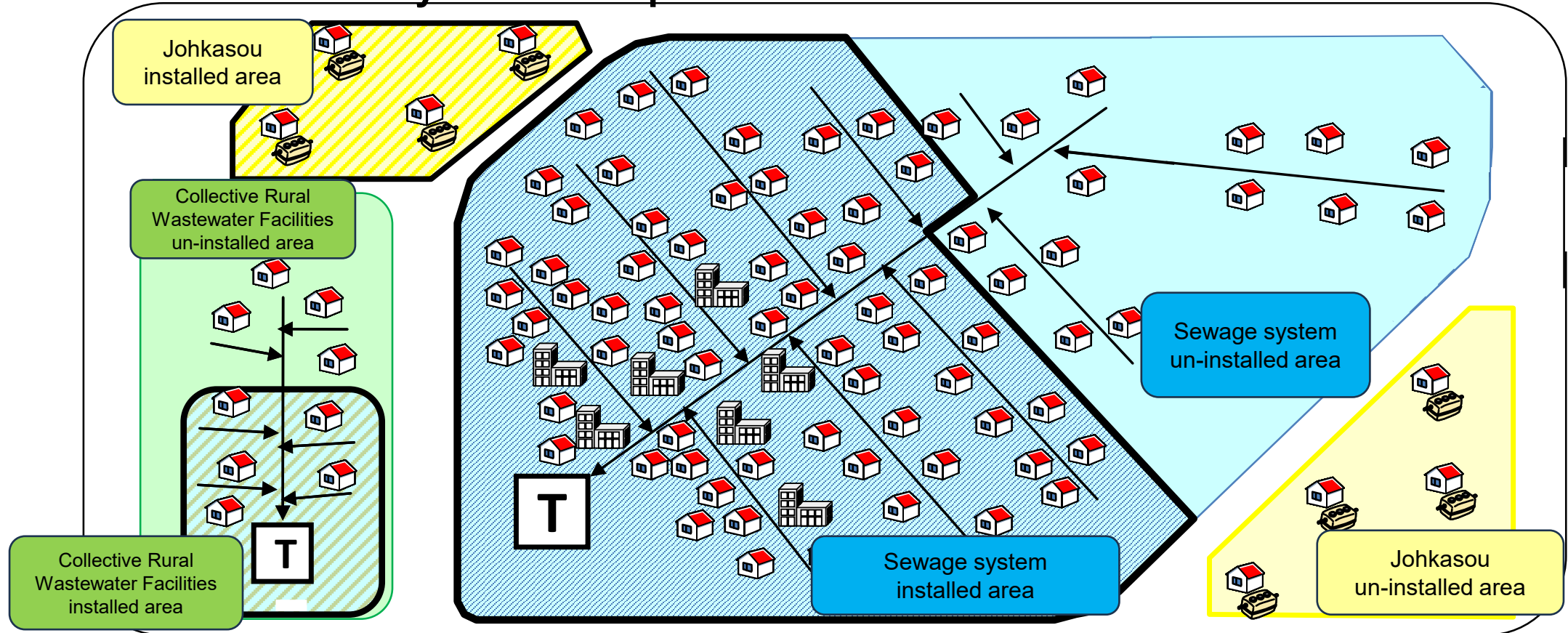
Chapter 1: General Information of Johkasou in Japan

Chapter 2: Legal Framework of Johkasou in Japan



1. General Information of Johkasou in Japan

■ Wastewater Treatment Systems in Japan



- **Sewage System** : managed by the Ministry of Land, Infrastructure, Transport and Tourism
- **Collective Rural Wastewater Facilities** : managed by the Ministry of Agriculture, Forestry and Fisheries
- **Johkasou**: managed by the Ministry of the Environment

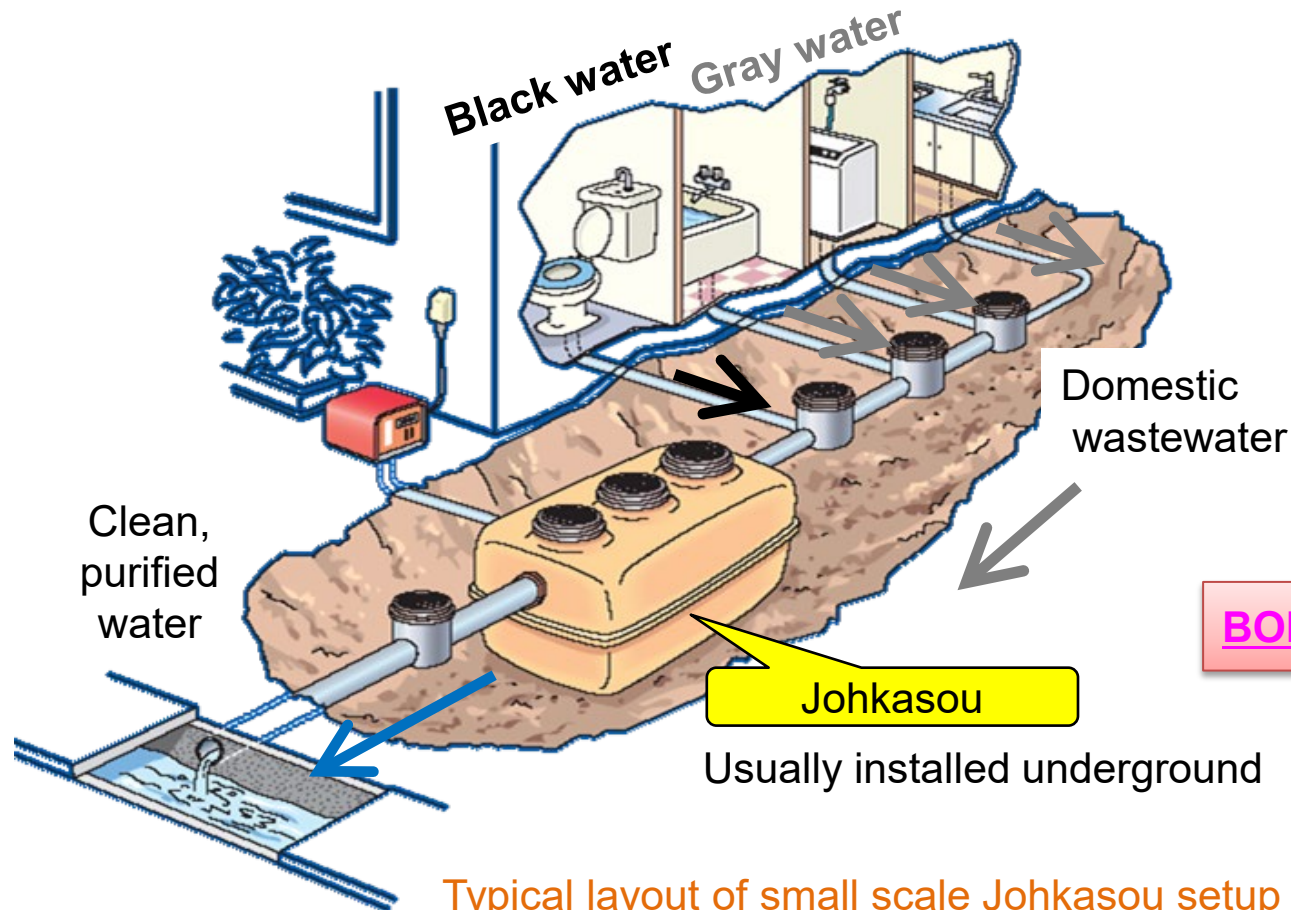
1. General Information of Johkasou in Japan

■ Current situation of population served for treating domestic wastewater by different wastewater treatment facilities in Japan

Type of treatment facility	Population served (x 1,000 people)	
	End of FY2022	End of FY2021
<u>Municipal sewage systems</u>	<u>101,280 (81.0%)</u>	<u>101,181 (80.6%)</u>
<u>Collective rural wastewater facilities</u> , including Facilities for fishing villages, Facilities for forestry villages, Simple wastewater facilities	<u>3,018 (2.4%)</u>	<u>3,103 (2.4%)</u>
<u>Johkasou</u>	<u>11,784 (9.4%)</u>	<u>11,758 (9.4%)</u>
Municipal Johkasou Installation Program	825	831
Johkasou Installation and Maintenance Program	6,229	6,203
Other Johkasou	4,730	4,725
<u>Community plants, etc.</u>	<u>160 (0.1%)</u>	<u>171 (0.1%)</u>
Total population served	116,242	116,213
<u>Percentage of population served</u>	<u>92.9%</u>	<u>92.6%</u>
Total population	125,065	125,540
Total population not served	8,823	9,327
<u>Un-installed rate</u>	<u>7.1%</u>	<u>7.4%</u>

1. General Information of Johkasou in Japan

- “Johkasou” is categorized as decentralized wastewater treatment system for domestic wastewater discharged by household, building and so-on.“
- Johkasou have a combined purification structure capable of treating both night soil (black water) and miscellaneous wastewater (gray water)
- Johkasou attains high and stable performance as same as that of sewage treatment plant and it has been installed totally more than 3.9 million unit in Japan.



Industrial wastewater, Domestic wastewater

Sewage treatment, Decentralized treatment

Septic tank, wetland, DEWATS, etc., Johkasou

BOD removal, Nitrogen and/or Phosphorous removal

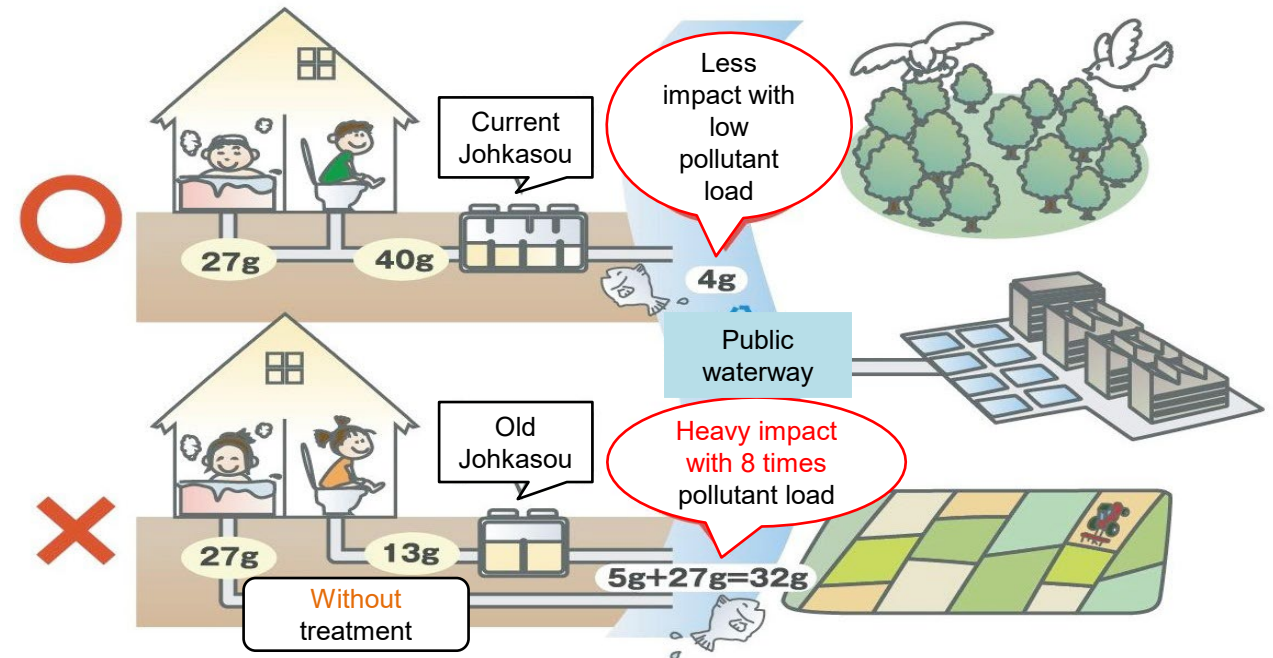
Typical layout of small scale Johkasou setup for household

1. General Information of Johkasou in Japan

■ Domestic wastewater = Black water (Night soil) + Gray water(kitchen drainage, bath drainage etc.)

○ Current Johkasou in Japan

Both Black water & Gray water are treated.



✗ Old type Johkasou in Japan

Only Black water is treated and have low treating ability

⇒ Heavy impact with 8 times pollutant load



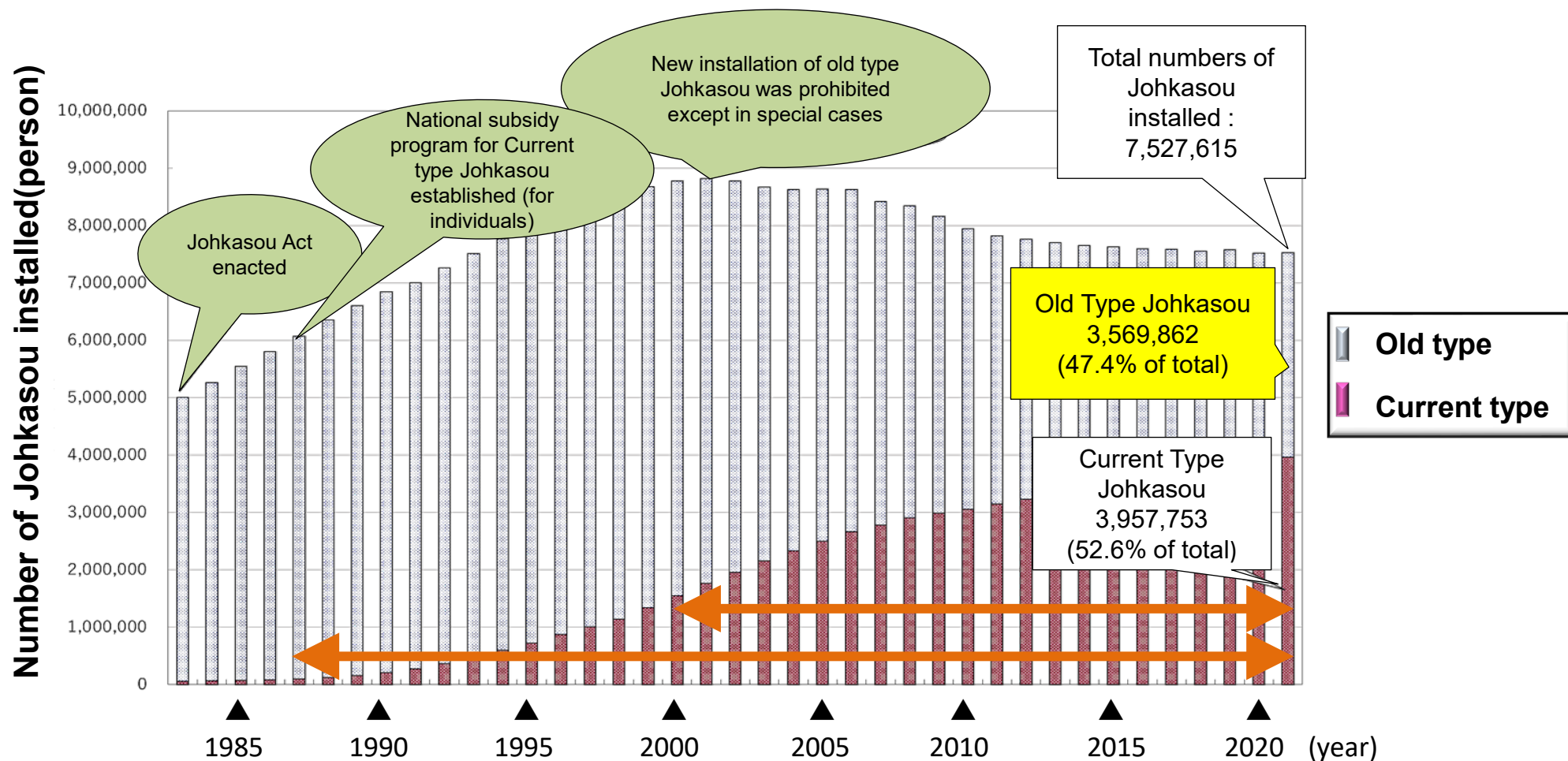
In Japan, old type Johkasou are treated as untreated domestic wastewater.



1. General Information of Johkasou in Japan

■ Configuration of old & current type Johkasou

- Though new installation of old type Johkasou was prohibited in 2000, still approx. 3.6 million sets of old type Johkasou are used in Japan.
- It is necessary to promote the conversion to the current type of Johkasou.



1. General Information of Johkasou in Japan

■ Comparison chart of Sewage, Johkasou and Septic tank

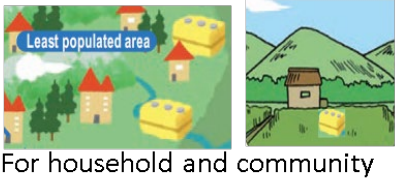
	Sewage (STP)	Johkasou	Septic tank
Category	Centralized	Decentralized	
Capacity(m ³ /day)	Large	Small to middle	Small
Application	City covering with pipeline network	For household, building, housing complex, community, hospital, school, public toilet, etc.	
Target	Black water (Toilet) & Gray water		Black water
Method	Aerobic (plus Anaerobic)		Anaerobic only
Treated water quality	- Good - BOD <20mg/L - Nitrogen & Phosphorous can be removed		- Poor, BOD ≒ 100mg/L - Nitrogen and Phosphorous can't be removed
Discharge	Clean discharge is discarded directly to the river, lake, sea and so-on.		- Dirty discharge is penetrated into ground - Gray water is discarded without treatment
Main body	Civil structure constructed at site	FRP manufactured in factory	Civil structure constructed at site
Maintenance works	Checking and adjustment, desludging, inspection, changing spare parts		Desludging only (every 3 to 5 years)
Total period for operation start	Long for planning, financing, construction	Short	

Johkasou can be recognized as a “prefabricated small scale sewage treatment plant” in wastewater management

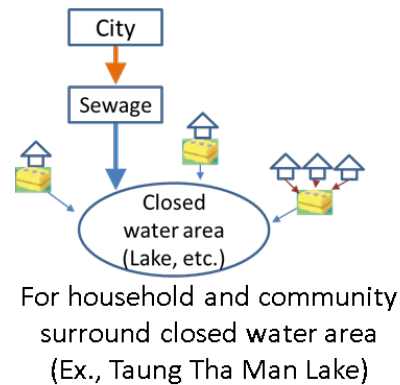
1. General Information of Johkasou in Japan

■ Application of Johkasou for domestic wastewater management

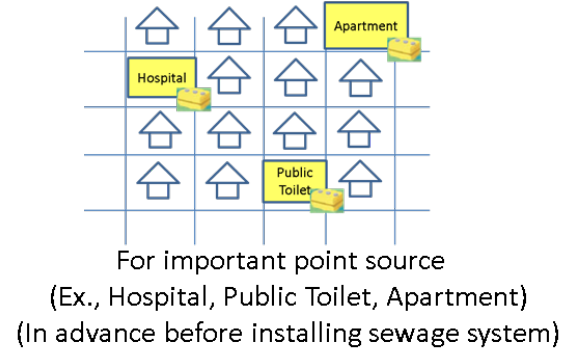
a) Rural, agricultural area, Geographical isolated area



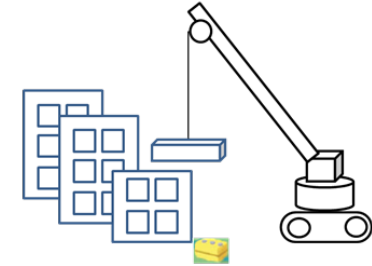
b) Closed water area



c) City



d) Rapid development area



e) Emergency hygiene improvement area (if any)

(Ex. Poverty houses where frequent water-borne diseases are infected)

f) Monumental Area

(Ex. For natural reserve, world heritage, etc.)

■ Example of Johkasou installation overseas



Restaurant
(China: 10m³/d)



Toilet in factory
(Vietnam: 5m³/d)



Canteen & toilet
(Myanmar: 30m³/d)



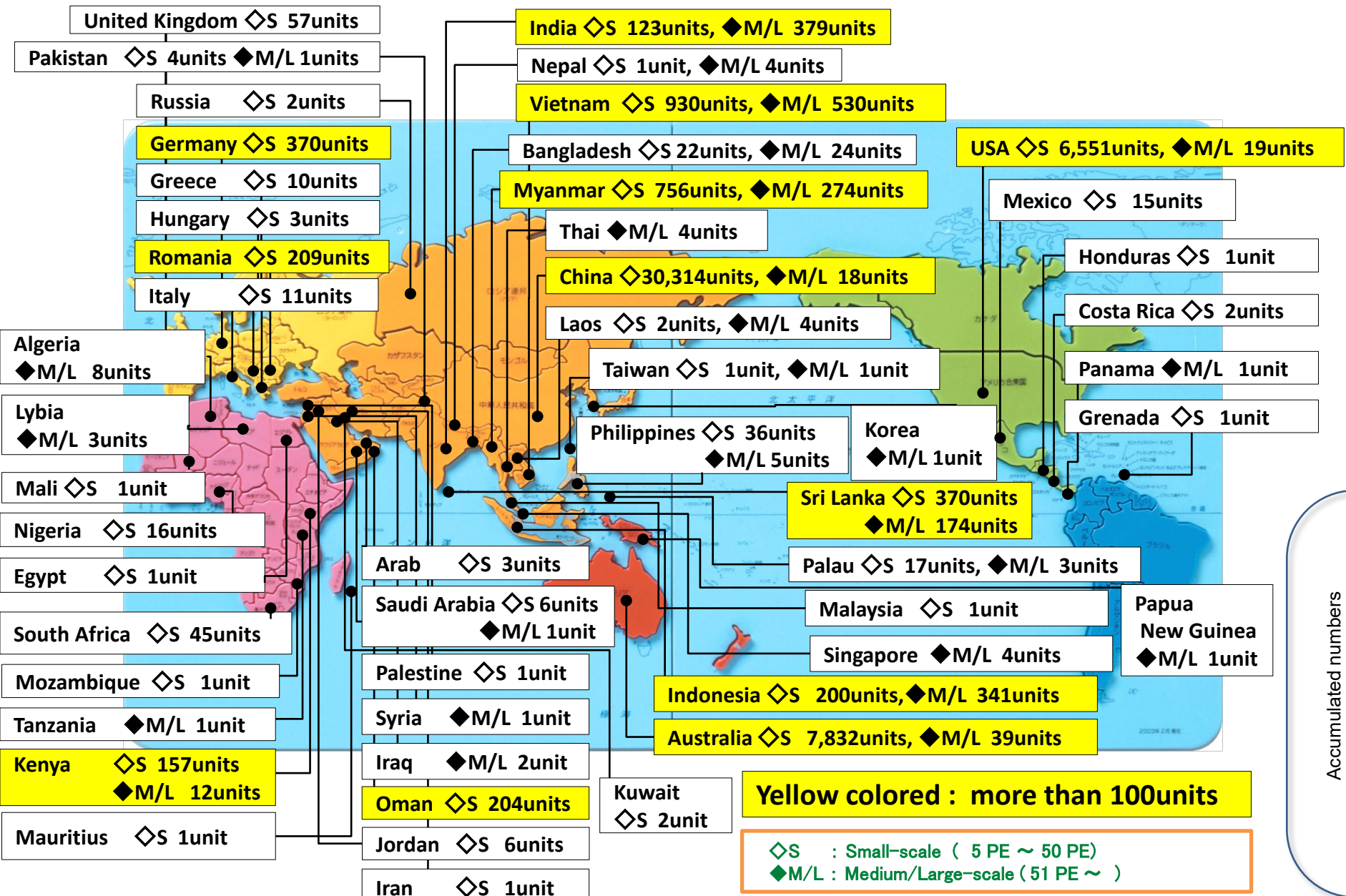
Employee dormitory
(Saudi Arabia: 530m³/d)

At the end of 2022, totally over 50,000 sets of Johkasou are installed overseas

1. General Information of Johkasou in Japan

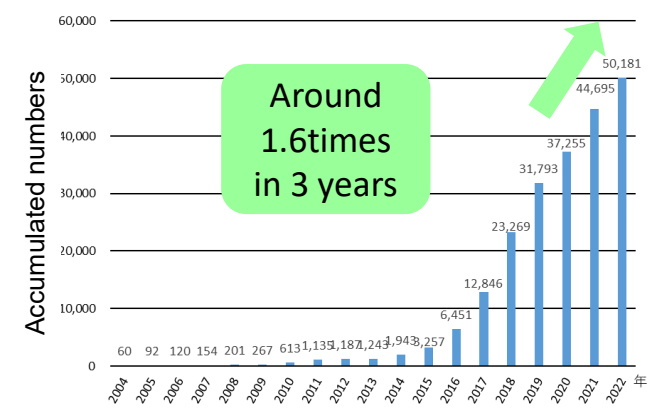
■ Installation records in Overseas (Total)

As of the end of December 2022 (Total) by Johkasou System Association



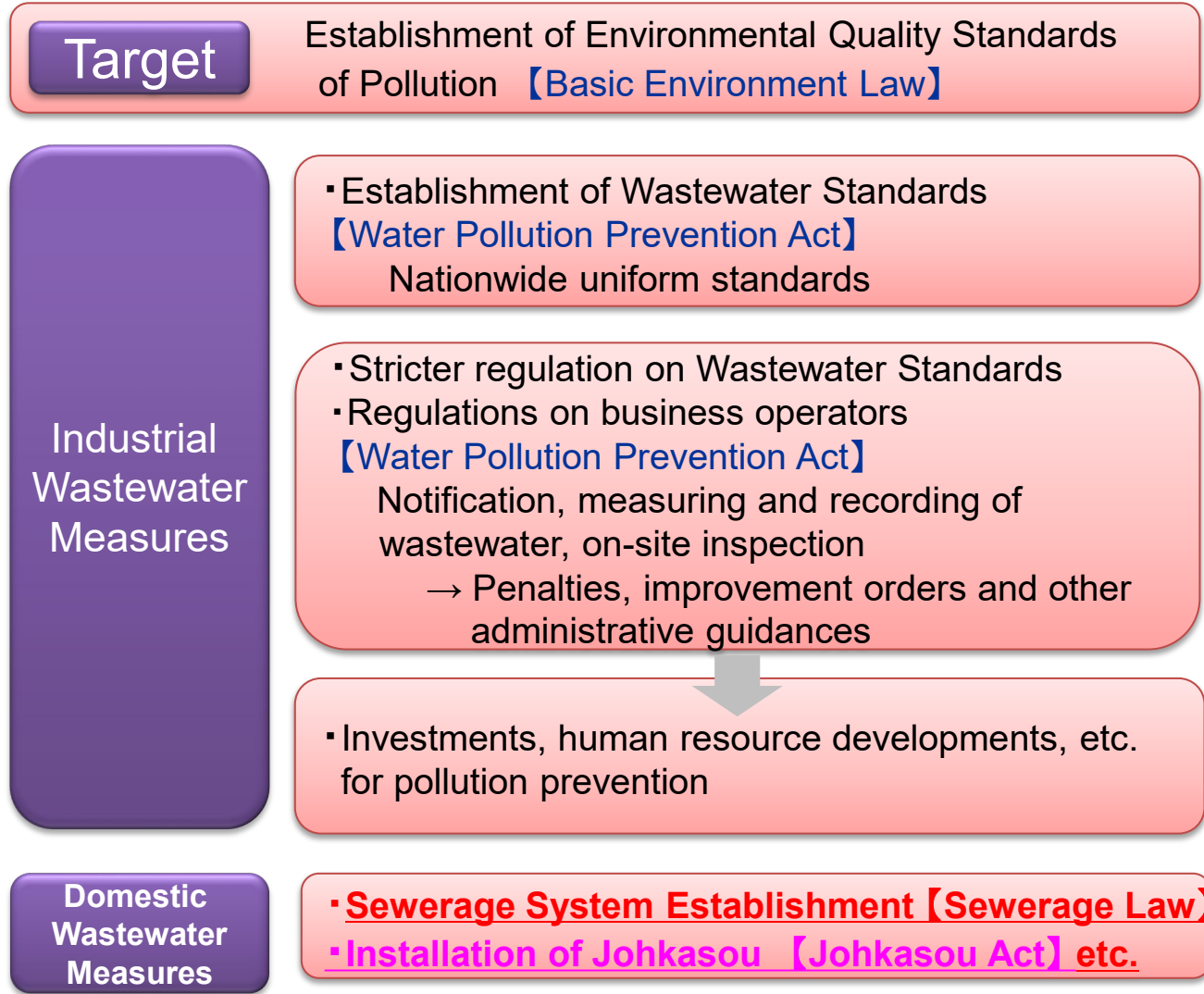
Small size 48,325units
 M/L size 1,856units
Total 50,181units
 Total 51 countries

■ Trend by years (Total)



2. Legal Framework of Johkasou in Japan

Overall concept of water environment improvement



2. Legal Framework of Johkasou in Japan

■ History of Johkasou Act

Year	Item
1960 to around 1980	With increasing population of flush toilet, rapid installation of Tandoku (old type) Johkasou to treat black water only
1983	Johkasou Act enacted (legislation introduced by a Diet member, came into force in 1985)
2000	Amendment: New installation of Tandoku-shori (old type) Johkasou was prohibited
2005	Amendment: Stricter water quality management systems introduced
2019	Amendment: <ul style="list-style-type: none">➤ Strengthening the authority of prefectural governors for conversion from Tandoku Johkasou (old type) to Gappei Johkasou (current type)➤ Clarification for proceeding Johkasou installation as a public works➤ Others

■ Purpose of Johkasou Act

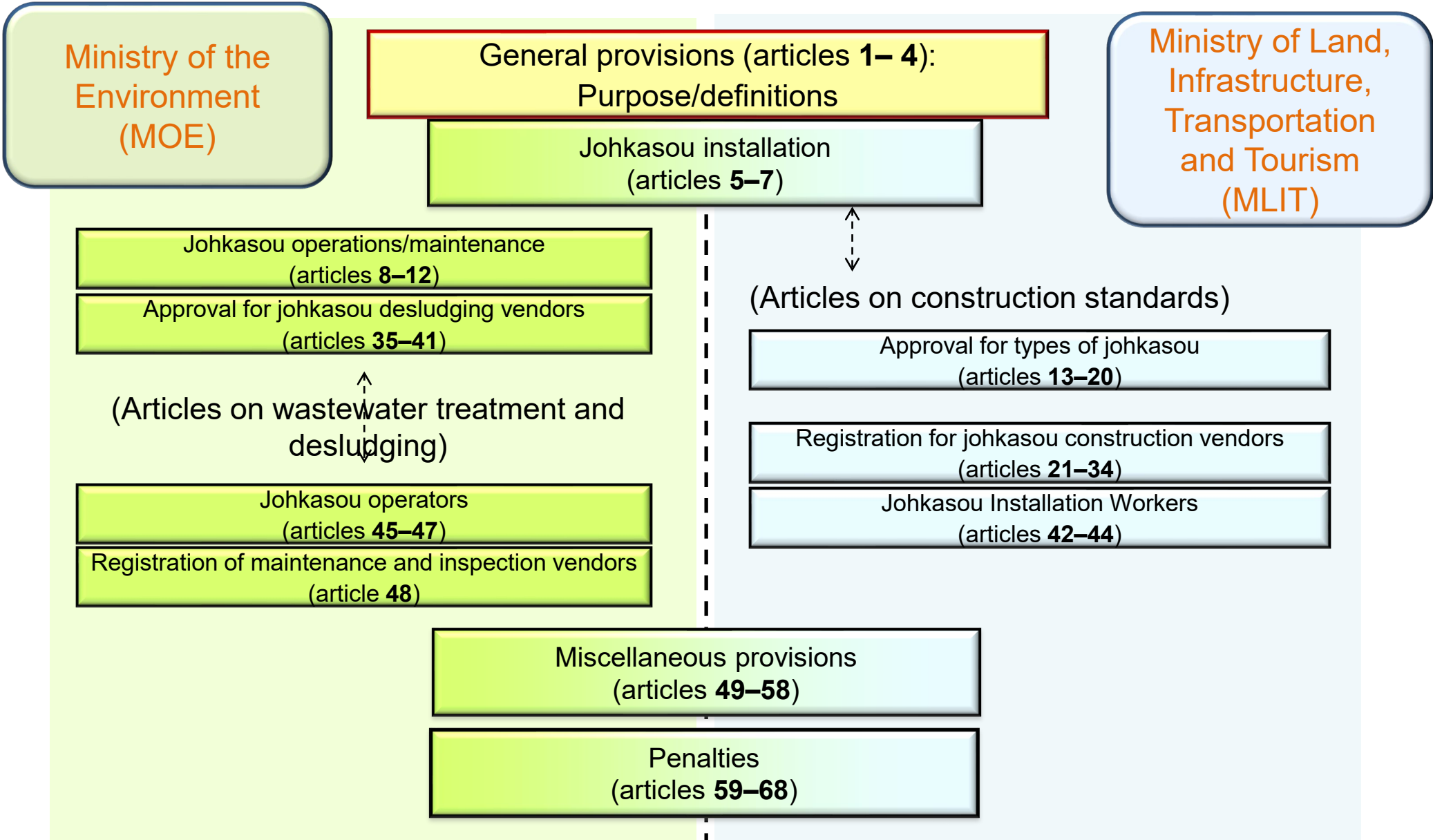
- ✓ Promotion of domestic wastewater (both black and gray water) treatment by Johkasou for conservation of water quality in public water area
- ✓ Preservation of the living environment
- ✓ Improvement of public health

■ Structure of Johkasou Act

- 1) Johkasou's manufacture and sales
- 2) Johkasou's notification of installation
- 3) Johkasou's installation and certification system of installation engineer
- 4) Johkasou's report of start date to use
- 5) Johkasou's operation
- 6) Johkasou's water quality inspection after installation
- 7) Johkasou's maintenance and certification system of maintenance engineer
- 8) Johkasou's desludge (Cleaning)
- 9) Johkasou's periodical check
- 10) Penalties for violating the Johkasou Act

2. Legal Framework of Johkasou in Japan

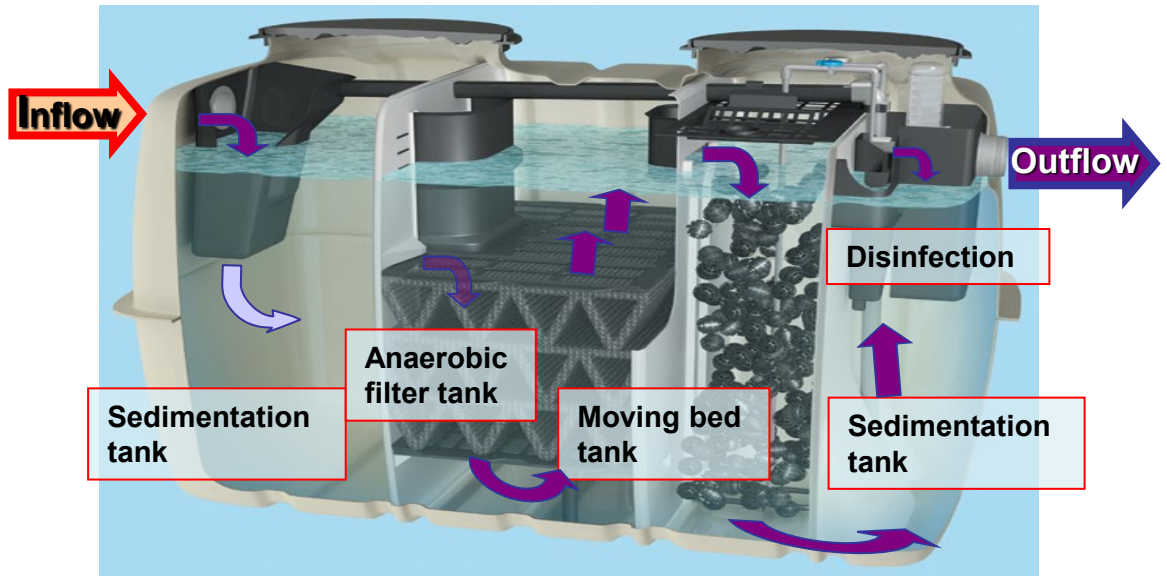
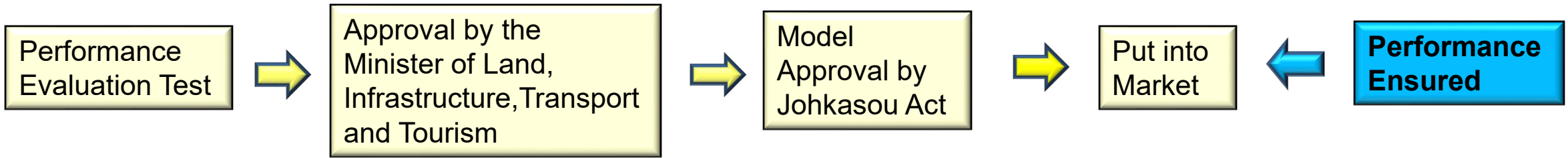
■ Outline of each article from 1 (one) to 68 (sixty eight) and its jurisdiction in Johkasou Act



2. Legal Framework of Johkasou in Japan

■ Approval process for types of Johkasou (Johkasou Act, Article 13)

- Parties intending to manufacture Johkasou in production plants shall obtain approval from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) for the type of Johkasou to be manufactured (does apply to test manufacturing)
- This process is suitable to Performance Evaluation System



Sample of Performance Evaluation Type Johkasou

- ✓ Johkasou's Performance Evaluation System
- ✓ Detail of Johkasou's Performance Evaluation System

https://www.bcj.or.jp/upload/rating/bizunit/hyoutei/joushi_hyoukahuhou.pdf

2. Legal Framework of Johkasou in Japan

■ Example of contents in Johkasou’s Performance Evaluation System

1) Performance Criteria

Applicant (Johkasou manufacture) chooses the application value for test criteria in below

BOD [20, 15, 10, 5], **T-N** [20, 15, 10, 5], **T-P** [2,1,0.5,0.1]
SS [20, 15, 10, 5], **n-Hex** [20, 10, 5, 3], **COD** [30, 15, 10]

3) Type of Performance Evaluation Test

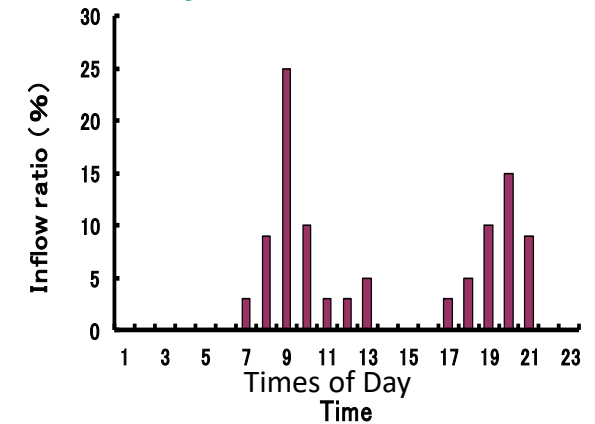
Test Method	Duration (weeks)	No. of unit	Evaluation Points
Short period constant temperature	Breeding - over 16 wks (13 & 20°C 8 wks respectively)	1 or 2	Water Quality/Sludge/Maintenance
On-site test 1	Breeding + over 48 wks	Over 1	Water Quality/Sludge/Maintenance
On-site test 2	Breeding + over 48 wks	Over 3	Water Quality/Sludge/Maintenance

4) Other Test

Test Method	Duration (weeks)	No. of unit	Evaluation Points
Maintenance evaluation test	-	Over 1	Ease of Maintenance
Sludge test	Breeding + over 12 wks	Over 1	Sludge

Note: In order to obtain approval, several tests are implemented in combination in the above tables.

2) Inflow Pattern



2. Legal Framework of Johkasou in Japan

■ Johkasou Installation Procedure and related Article of Johkasou Act

Installation notification (Article 5)



←..... (Certify under the Building Standards Act when necessary)

Construction (Article 6)

- Johkasou contractor must register with the prefectural governor (Article 21)
- Johkasou contractor must dispatch the certified installation technician on each office (Article 29)

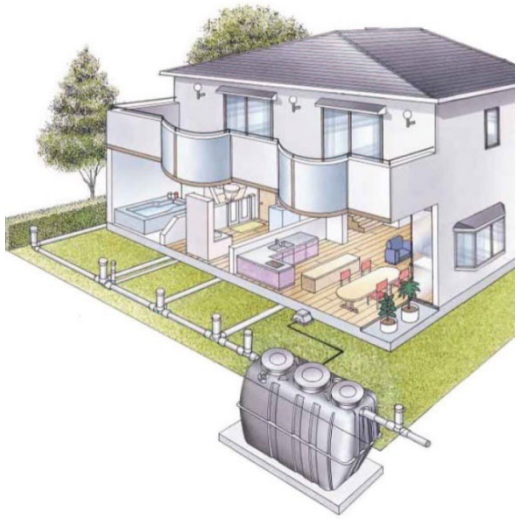


←..... (Can issue administrative recommendations when necessary)

Post-installation legal inspections (Article 7)



Discontinuance notification (Article 11-2)



2. Legal Framework of Johkasou in Japan

■ JIS A3302-2000 Estimation of population for wastewater purifier of buildings

Example

$$1 \text{ P.E.} = 200\text{L/day, } 40\text{g BOD/day}$$

● General household

【Equation】 If total floor area $A \text{ (m}^2\text{)} \leq 130\text{m}^2$, Johkasou capacity (P.E.) shall be 5 P.E.

● Hotel with a wedding hall

【Equation】 Johkasou capacity (P.E.) = $0.15 \times (\text{total floor area } A \text{ (m}^2\text{)})$

● Large hospitals with commercial kitchens or laundry facilities and more than 300 beds

【Equation】 Johkasou capacity (P.E.) = $11.43 \times (\text{number of beds } B - 300) + 2,400$

Large categories	Detail categories (Equations)	Large categories	Detail categories (Equations)
1. A place where people gather	Theater, etc. (3)	7. Parking	Highway rest area, etc. (7)
2. Residence	Apartment, etc. (6)	8. School	Library, etc. (3)
3. Hotel	Motel, etc. (4)	9. Office	Office with canteen, etc. (2)
4. Medical facility	Clinic, etc. (5)	10. Work facility	Laboratory, etc. (2)
5. Store	Restaurant, etc. (6)	11. Others	Public toilet, etc. (6)
6. Amusement facilities	Disco, etc. (13)		

Total 11 large categories, 57 equations

2. Legal Framework of Johkasou in Japan

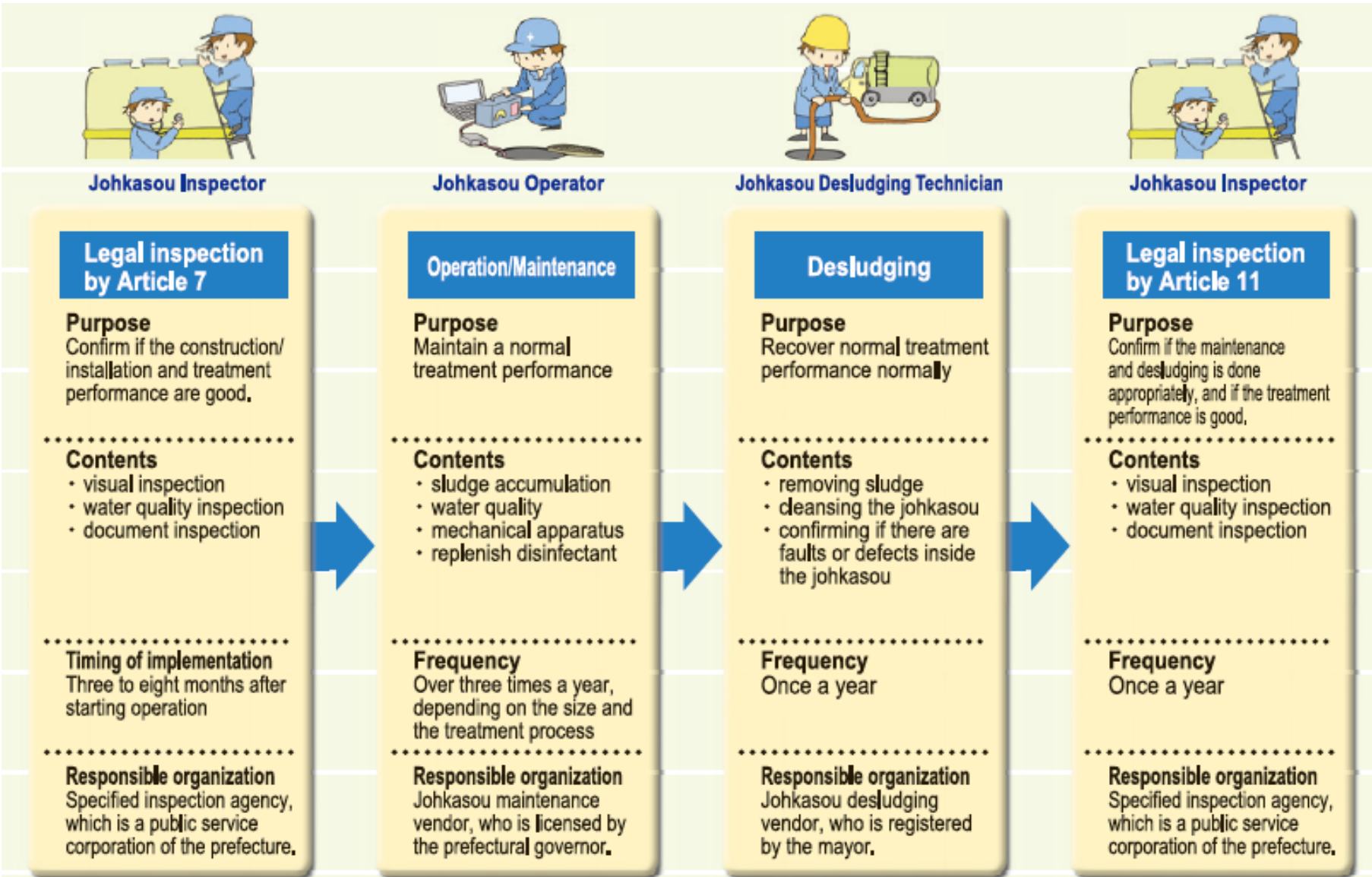
- Post-installation water quality inspection (Article 7)

Inspection category	Inspection items	
Visual inspection	▪ Installation status	▪ Usage status
	▪ Operational status	▪ Foul odors
	▪ Water flow	▪ Use of disinfectant
	▪ Mosquitoes, flies, etc.	
Water quality inspection	▪ Hydrogen ion concentration	▪ Chlorine ion concentration
	▪ Sludge settling ratio	▪ Residual chlorine concentration
	▪ Transparency	▪ Biochemical oxygen demand
	▪ Dissolved oxygen	
Document inspection	▪ Pre-usage maintenance inspection record	

➤ Because essential johkasou functions cannot be confirmed without actually using the equipment, inspections are carried out once those functions are generally up and running. Inspections focus on whether the johkasou is performing the expected treatment functions with the aim of rectifying any deficiencies as soon as possible.

2. Legal Framework of Johkasou in Japan

■ Inspections and Maintenance



2. Legal Framework of Johkasou in Japan

■ Johkasou corporate registration process

Prefecture

Registration
Instructions, advice, recommendations, etc.



Johkasou construction company



National qualifications

【Certified Johkasou Installation Worker】
Person certified to supervise Johkasou **construction**



Municipality

Approval
Instructions, advice, recommendations, etc.



Johkasou Desludging Technician
Johkasou desludging company

Prefecture or other

Registration
Instructions, advice, recommendations, etc.



Johkasou Operator
Johkasou maintenance inspection company





【Certified Johkasou Operator】
Person certified to supervise Johkasou **maintenance inspections**



2. Legal Framework of Johkasou in Japan

National johkasou qualifications

National qualification	Description	Certifying agency
Certified Johkasou Installation Worker	Person certified to supervise johkasou construction	 <p>MLIT Ministry of Land, Infrastructure, Transport and Tourism</p>
Certified Johkasou Operator	Person certified to carry out maintenance inspections on johkasou	 <p>Ministry of the Environment 環境省 Government of Japan</p>

2. Legal Framework of Johkasou in Japan

■ For Johkasou Technicians by Japan Education Center of Environmental Sanitation (JECES)

- Johkasou technicians should acquire extensive knowledge on not only wastewater treatment/johkasou, but also water environment conservation and public health.
- Curriculums for johkasou operator and johkasou installation worker are as shown below.

Johkasou Operator by Article 45	
● Fundamental of johkasou	8 H
● Laws and regulations related with johkasou	4 H
● Structure and function of johkasou	22 H
● Introduction to installation of johkasou	4 H
● Operation and maintenance of johkasou	30 H
● Water quality management of johkasou	10 H
● Introduction to desludging of johkasou	2 H
Total	80 Hours (13 Days)
	+Test 2 Hours



Johkasou Installation Worker by Article 42	
● Fundamental of johkasou	8 H
● Laws and regulations related with johkasou	3 H
● Structure and function of johkasou	15 H
● Management of johkasou installation	8 H
● Introduction to O&M and desludging of johkasou	3 H
Total	37 Hours (5 Days)
	+Test 2 Hours



THANK YOU FOR YOUR KIND ATTENTION.

At Kikuchi Gorge, Kikuchi City, Kumamoto Prefecture

